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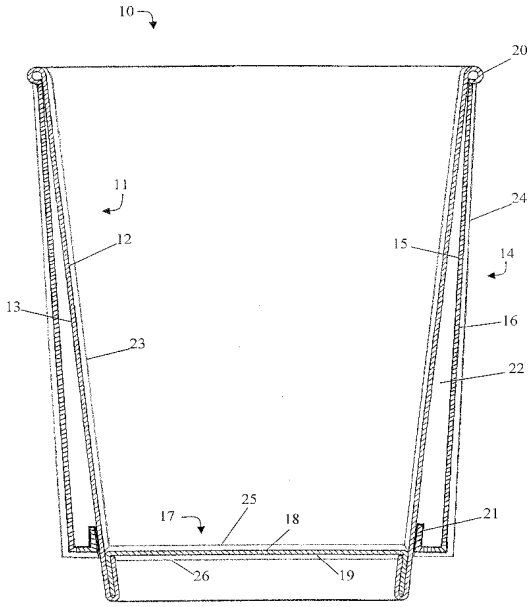

FIG. 1

(57) **Abstract**: The invention is directed to a multi-wall container, including a first inner sidewall having a first face and a second face, wherein the first face is polycoated, at least a second outer sidewall having a first face and a second face, wherein the second face of the second sidewall is polycoated. The container provides enhanced use for both hot and cold products, using the minimal amount of materials so as to be cost-effective. The arrangement of the invention may also allow for the container configuration to be tailored to the type of products to be used therewith, with the temperature insulative characteristics selectively modified to provide desired temperature insulation and sensitivity to the user when handling the container.

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MULTI-WALL CONTAINER

[0001] The invention relates to a multi-wall container for beverages or the like. More particularly, the invention relates to a dual or multi-wall paper container which is usable for hot and cold beverages or other liquids, in a manner to insulate the user's hand from the temperature of the liquid and provide other advantages.

BACKGROUND OF THE INVENTION

[0002] It is well known in the art to form disposal containers such as cups, bowls, plates or trays from a variety of material, particularly from paper, expanded resins or polystyrene. Containers such as cups, bowls or the like, in many cases are made of a single-ply of paper materials, and may be coated with a wax, thermoplastic synthetic resin film or other material to prevent absorption of the liquid put therein. Such containers may be suitable for some uses, but are difficult to handle or have deficiencies when a hot or cold beverage or other liquid are placed therein. The polystyrene cups or containers are typically made by adding a foaming agent to a polystyrene resin, casting the mixture into a mold, heating the resin under pressure to foam it, and removing the shaped article from the mold. Although the polystyrene products are more useful for holding hot or cold products, they also consume more space due to the increased thickness relative to other paper type containers. Containers formed of expanded synthetic resin material have found wide acceptance in that the material is a thermal insulator, such that the containers can help maintain the temperature of the liquid product, whether hot or cold for longer periods of time, and protect the users hand from the temperature of the liquid product. Though providing insulation to the hand when holding such a container, this material also does not provide any temperature sensitivity to the hand or an indication of how hot the beverage may be in the cup, which can result in the user drinking a very hot liquid without forewarning and causing discomfort or burning of the lips or mouth upon drinking. Further, polystyrene or like containers, are not environmentally friendly in that they are not biodegradable or recyclable. As a result, buyers and users, such as restaurants and other establishments, are turning away from the use of such material and containers, as well as individual consumers for home uses.

[0003] A variety of paper-based cups have been proposed as environmentally acceptable alternatives to polystyrene containers. Unfortunately, most attempts to produce paper-based hot and cold-insulating cups have proved costly due to the complexity of their manufacturing processes. Standard single layer paper containers are recyclable and are therefore environmentally sound. However, because the single layer paper container is a poor insulator, any food product placed in such container will more quickly achieve ambient temperature, thus losing any heat or coolness associated with the product, versus expanded resin or multi-layer paper containers. For example, with a cold product in the container, the temperature of the product will more quickly form condensation on the outer surfaces of the container, and lead to quicker warming of the product. For hot products, the heat conducts through the container and is quickly lost to the atmosphere, cooling the product. Moreover, when handling extremely hot or cold food products, such containers are uncomfortable to handle, as the heat or cold of the liquid is transmitted to the exterior of the container. Particularly, any hot liquid or food product placed in a single layer container may burn the consumer. Another problem with such containers, in association with a cold product, is that condensation will form on the outside of the container making them slippery and difficult to handle. Furthermore, while the single layer construction is very inexpensive, such containers are more fragile and can easily lose their shape when being used.

[0004] To overcome some of these disadvantages, such as for cups used for coffee or other hot liquids, there has been developed a sleeve type product, having a side wall which is corrugated, that is slipped onto the cup to form a heat-insulating jacket. There have also been developed cups that have a corrugated sleeve provided on the exterior in an attempt to do a similar thing. For such cups, the process for manufacture involves additional steps of forming the corrugated paper jacket and bonding it to the outer surface of the side wall of the cup. These cups, however, have proved to be aesthetically unappealing and structurally deficient. In this regard, only the ridges of the corrugated jacket contact the body of the paper cup in such a way that the bond between the two is so weak that the cup and jacket easily separate. Also such cups are not easily nested making storage difficult. Such cups with these types of outer jackets do not effectively seal the inner cup from air inflow, thus allowing for condensation to form on the outer face of the inner cup wall. The outer face of the inner cup is also not coated with a wax or

thermoplastic synthetic resin film, which allows moisture to absorb into the paper fibers of the inner cup, resulting in quick degradation of the integrity of the inner cup.

[0005] Notwithstanding the state of the art as described herein, there is a need for further improvements in containers useful for hot and cold beverages.

SUMMARY OF THE INVENTION

[0006] In general, one aspect of the invention is to provide a multi-wall container. The multi-wall container includes a first inner sidewall having a first face and a second face, wherein the first face of the first sidewall is laminated or coated with a polycoating material, a second outer sidewall having a first face and a second face, wherein the second face of the second sidewall is laminated or coated with a polycoating material, and a bottom wall having a first face and a second face, wherein the first and second faces of the bottom wall are laminated or coated with a polycoating material. The multi-wall container is suitable for usage with both hot and cold beverages. The arrangement of the containers according to the invention provide enhanced use for both hot and cold products, using the minimal amount of materials so as to be cost-effective. The arrangement of the invention may also allow for the container configuration to be tailored to the type of products to be used therewith, with the temperature insulative characteristics selectively modified to provide desired temperature insulation and sensitivity to the user when handling the container.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] FIG. 1 is a cross-sectional view of a multi-wall container according to an embodiment of the invention; and

[0008] FIG. 2 is a cross-sectional view of a multi-wall container including additional polycoated walls according to an embodiment of the invention.

[0100] FIG. 3 is a cross-sectional view of a multi-wall container according to another embodiment of the invention.

[0009] FIG. 4 is a cross-sectional view of a multi-wall container according to another embodiment of the invention.

DETAILED DESCRIPTION OF THE INVENTION

[0010] The invention provides a dual or multi-wall container particularly suitable for usage with both hot and cold beverages. As seen in the example of FIG. 1, a multi-wall container is generally indicated by 10, and includes inner sidewall 11, outer sidewall 14 and bottom wall 17. Inner sidewall 11 includes first face 12 and a second face 13. Outer sidewall 14 includes first face 15 and second face 16. Bottom wall 17 includes first face 18 and second face 19.

[0011] The multi-wall container 10 is formed from commonly used paperboard materials for paper drinking cups and may include virgin and recycled paperboard materials. The coatings used to protect the paperboard materials from the absorption of liquid may include commonly used food and beverage container coatings such as polyethylene coatings, biodegradable bioplastic coatings such polylactic acid, biodegradable calcium carbonate-based laminates or a blend of these coatings, or others that may be suitable. These coatings may be used individually or in a blend of these coatings. Further, the inner wall, bottom wall and outer wall of the same container may use different coatings as desired for the specified application. The paperboard layers of multi-wall container 10 may have a thickness in the range from about 0.25 to about 0.45 mm. Inner sidewall 11 includes an outwardly extending ridge or brim portion 20 located around the upper portion of multi-wall container 10. Ridge portion 20 not only facilitates the flow of liquids from container 10, but also provides a region where outer sidewall 14 may sealingly engage inner sidewall 11.

[0012] Outer sidewall 14 also may include a spacer portion 21, such as a curved, u-shaped or box-like folded portion at the bottom edge, that is formed towards and in contact with second face 13 of inner sidewall 11. In this example, the spacer portion 21 is shown as being formed as part of the outer sidewall 14, but alternatively, the spacer portion 21 may be a separate member positioned at the bottom or adjacent the bottom of the outer sidewall 14, or an integral member positioned adjacent the bottom. Portion 21 of outer sidewall 14 creates a tapered cavity 22 between the inner sidewall 11 and outer sidewall 14 extending from the top portion of the container 10 to adjacent the bottom portion, and an airtight seal may be formed between second face 13 of inner sidewall 11 and first face 15 of outer sidewall 14. In general, the outer sidewall

14 is sealed to the inner wall 11 to substantially prevent air inflow between the inner sidewall 11 and outer sidewall 14. The cavity 22 provides insulative characteristics, particularly as the size of the cavity increases toward the bottom of the container 10, and at the location the container is normally handled by a user. The insulation provided by the cavity 22 is further maintained and enhanced by effectively sealing the cavity 22 at both the top and bottom edges, such that airflow or air exchange with the outside atmosphere is not enabled, and the static air in the cavity forms a thermal barrier between the inner wall 11 and outer wall 14. The cavity 22 is effectively sealed from the outer atmosphere, such that no moisture in the atmosphere, primarily water vapor present in the air, can be introduced into the cavity 22, thereby preventing any condensation in the cavity 22. Further, during manufacture of the container 10, the humidity of the environment is controlled during the process of forming and adhering the outer layer/wall 14 to the inner layer/wall 11, such that a substantially dry air is trapped in the cavity 22. The static air in the cavity 22 thus has a very low dew point due to the lower relative humidity of the trapped air, thereby facilitating the prevention of condensation in the cavity 22 when a cold liquid or cold product is put into container 10. The dew point relates to the temperature at which a parcel of air must be cooled, at a constant barometric pressure, for water vapor to condense into water. By controlling the humidity in the air within the cavity 22 to be low, the dew point temperature thus goes down significantly, and in general, the dew point temperature will be lower than any expected temperature created in the cavity 22 by the liquid or product in the container 10. The multi-wall container 10 is manufactured such that the static air in the cavity 22 between second face 13 of inner sidewall 11 and the first face 15 of outer sidewall 14 does not have the requisite properties that allow condensation to form in the cavity when the temperature of the static air in the cavity fluctuates to levels forming condensation on the second face 16 of outer sidewall 14. The combination of these features thereby prevents the formation of condensation in cavity 22 or other moisture from penetrating cavity 22.

[0013] The cavity 22 may also be configured to provide desired insulative characteristics, with the insulative characteristics being modifiable based on the dimensions of the cavity 22. In this example, the dimensions of cavity 22 can be modified by changing the dimension of the portion 21, to increase or decrease the size and volume of cavity 22. The portion 21 may be provided with alternative dimensions in any suitable manner, such as by changing the dimensions of the spacer portion, such as a curved or u-shaped portion, and/or

providing multiple folds in this portion to increase the dimensions of the spacer portion. Depending on what the container 10 is to be used for, increasing or decreasing the size of the cavity 22 toward the bottom of the container 10 may be desired, to enhance the insulative characteristics at desired positions on the container 10, such as relative to the location(s) the container will normally be handled by a user. The modification of the dimensions of the cavity 22 allows modulation of the temperature sensitivity and insulative characteristics of the container in a desired manner. Changing the dimensions of the cavity 22 allows modulation of the temperature differential between the inner wall 11 and outer wall 14, and the time and distance required for heat to be transferred between the inner wall 11 and outer wall 14, and for heat transfer to occur between the contents of the container 10 and the outside ambient atmosphere. For example, in the design of container 10 formed as a beverage cup, the cavity 22 provides temperature insulation relative to a cold or hot liquid in the cup 10. As an example, for a liquid having a temperature of about 25 degrees F, as the width of cavity 22 at the top of container 10 is 0.0 mm, the temperature at the outside wall 14 will correspondingly be closer to the temperature of the liquid, but at a distance of about 50 mm downwardly from the top of wall 14, the cavity may have a width of about 1.25 mm for example, and provide a higher temperature at the outer wall 14 of about 45 degrees F. Thus, as the size of the cavity 22 increases toward the bottom of the cup 10, the temperature at the outer surface of wall 14 increases, such that the temperature of the cold liquid is mediated to the users hand. For a hot liquid in cup 10, such as about 185 degree F liquid, as the width of cavity 22 at the top of container 10 is 0.0 mm, the temperature at the outside wall 14 will correspondingly be closer to the temperature of the liquid, but at a distance of about 50 mm downwardly from the top of wall 14, the cavity may have a width of about 1.25 mm for example, and provide a temperature at the outer wall 14 of about 171 degrees F. At a distance of 87 mm from the top of the wall 14, the cavity may have a width of about 2.0 mm, and a temperature of about 160 degrees F may be provided at the outer surface of wall 14. Thus, as can be seen from this example, the temperature of the outer wall 14 may vary dependent on the dimensions of the cavity 22, both for cold and hot products in container 10, providing significant temperature mediation to the users hand relative to the temperature of the product in the container 10. Thus, the size of the cavity 22 may be increased to provide further temperature mediation if desired, while also reducing the heat transfer characteristics to maintain the temperature of the product more stable over a longer period of time.

[0014] In this embodiment of the invention, first face 12 of inner sidewall 11, is coated with a polycoating material. Similarly, the second face 16 of outer sidewall 14 is coated with a polycoating material. To form a fully polycoated interior surface to the container 10, the first face 18 and second face 19 of bottom wall 17 may be coated with a polycoating material. Polycoating first face 12 of inner sidewall 11 forms polycoated surface 23 while polycoating bottom layer 17 forms a polycoated layer 25. Polycoating the interior surface 12 of wall 11 and exterior surface 16 of outer wall 14 provides enhanced structural integrity to each of the walls 11 and 14, and prevents any absorption of condensation or any liquid therein, thereby retaining the integrity of each paper layer used in each wall 11 and 14. As the exterior surface 13 of wall 11 and the interior surface 15 of wall 14 are exposed only to airtight cavity 22, which does not have the properties to form condensation when atmospheric conditions form condensation on the second face 16 of outer wall 14, no condensation should form on these surfaces which could be absorbed. Furthermore, polycoating the interior surface 18 of bottom wall 17 forms polycoated surfaces on the entire interior of the container 10 to prevent absorption and enhance integrity of the container 10, such that the polycoated surfaces protect the paper materials used to form the walls 11, 14 and 17.

[0015] Generally, the outer wall 14 may be adhered to the sidewall 11 in any suitable manner, such as by us of an adhesive at the top portion of the walls. By adhering the wall 14 to the wall 11 at the top portion, the bottom portion 21 is generally sealed to the wall 11 to form cavity 22 as desired. If desired, the inner portion of folded portion 21 could also be adhered to the wall 11, such as by an adhesive.

[0016] In an alternate embodiment of the invention as shown in Fig. 2, first face 12 and second face 13 of inner sidewall 11, are coated with a polycoating material. Similarly, the first face 15 and second face 16 of outer sidewall 14 are coated with a polycoating material. To form a fully polycoated interior surface to the container 10, the first face 18 of bottom wall 17 may be coated with a polycoating material and second face 19 may also be polycoated. Coating first face 12 of inner sidewall 11 forms polycoated surface 23. Thus, each of the surfaces of each wall 11 and 14 are polycoated to provide enhanced structural integrity to each of the walls 11 and 14, and prevent any absorption of condensation or any liquid therein, thereby retaining the integrity of each paper layer used in each wall 11 and 14. Polycoating first surface 12 and first surface 18 of

the sidewall 11 and bottom wall 17 provide an entire interior surface which is polycoated to retain any liquid material in container 10 in the desired fashion. Polycoating the outer surface 13 of the sidewall 11 and the inner surface 15, of the sidewall 14, as shown at 27 and 28, forms polycoated surfaces throughout the cavity 22, which enhances the thermal barrier created by the cavity 22. Furthermore, polycoating the inner face 12 of wall 11, outer face 16 of the sidewall 14, as well as the first face 18 and second face 19 of bottom wall 17, forms polycoated surfaces 23, 24, 25 and 26, each of which protects the paper materials used to form the walls 11, 14 and 17.

[0017] In another embodiment as shown in Fig. 3, the multi-wall container is generally indicated by 30, and includes inner sidewall 31, outer sidewall 34 and bottom wall 37. Inner sidewall 31 includes first face 32 and a second face 33. Outer sidewall 34 includes first face 35 and second face 36. Bottom wall 37 includes first face 38 and second face 39.

[0018] In an example, multi-wall container 30 is formed of a paperboard material, such as a solid bleach sulfate paperboard, or a paperboard with a calcium carbonate/polyethylene blend laminate which is more readily biodegradable for example. The paperboard layers of multi-wall container 30 may have a thickness in the range from about 0.25 to about 0.45 mm, and the thickness of each layer may be distinct or do not have to be equivalent to one another.

[0019] Inner sidewall 31 includes an outwardly extending ridge or brim portion 40 located around the upper portion of multi-wall container 30. Ridge portion 40 not only facilitates the flow of liquids from container 30, but also provides a region beneath which the outer sidewall 34 may sealingly engage inner sidewall 31 at its top edge.

[0020] Outer sidewall 34 also may include spacer portion 41, such as curved, u-shaped, folded or box-like folded portions, at the bottom edge, and spacer portion 42 at the top edge, that are formed towards and in contact with second face 33 of inner sidewall 31. Spacer portions 41 and 42 of outer sidewall 34 creates a cavity 44 between the inner sidewall 31 and outer sidewall 34 extending from the top portion of the container 30 to adjacent the bottom portion, and an airtight seal may be formed between second face 33 of inner sidewall 31 and first face 35 of outer sidewall 34. In general, the outer sidewall 34 is sealed to the inner wall 31 to substantially prevent air inflow between the inner sidewall 31 and outer sidewall 34. The cavity 44 provides

insulative characteristics, with the insulative characteristics being modifiable based on the dimensions of the cavity 44. In this example, the dimensions of cavity 44 can be modified by changing the dimensions of the portions 41 and 42, to increase or decrease the size and volume of cavity 44. The spacer portions 41 and 42 may be provided with alternative dimensions in any suitable manner, such as by changing the dimensions of the spacer portions 41 and 42, and/or providing multiple folds in these portions 41 and 42 to increase its dimensions. The spacer portions 41 and 42 may be of the same or different dimensions, to make the size of the cavity uniform or of increasing volume toward the top or bottom of the container 30 if desired. Depending on what the container 30 is to be used for, increasing or decreasing the size of the cavity 44 toward the bottom or top of the container 30 may be desired, to enhance the insulative characteristics at desired locations on the container 30, such as relative to the location(s) the container will normally be handled by a user. The modification of the dimensions of the cavity 44 allows modulation of the temperature sensitivity and insulative characteristics of the container in a desired manner. Changing the dimensions of the cavity 44 allows modulation of the temperature differential between the inner wall 31 and outer wall 34, and the time and distance required for heat to be transferred between the inner wall 31 and outer wall 34, and for heat transfer to occur between the contents of the container 30 and the outside ambient atmosphere. The insulation provided by the cavity 44 is further maintained and enhanced by effectively sealing the cavity 44 at both the top and bottom edges, such that airflow or air exchange with the outside atmosphere is not enabled, and the static air in the cavity forms a thermal barrier between the inner wall 31 and outer wall 34. Further, as the cavity 44 is effectively sealed from the outer atmosphere, no moisture in the atmosphere is introduced into the cavity 44, thereby preventing any condensation in the cavity 44. Additionally, the air in cavity 44 does not have the properties to form condensation when atmospheric conditions outside container 30 would cause condensation on the second face 36 of outer wall 34.

[0021] As an example, in testing of cold and hot products in an example of the container 30, for a liquid having a temperature of about 25 degrees F., the width of cavity 44 being uniform in this example, may be 3.0 mm for example, and a temperature at the outer wall 34 of about 55 degrees F., or a temperature differential of about 30 degrees F. at the outside wall 34. For a hot liquid/product in container 30, such as about 185 degrees F., and a uniform width of cavity 44 of about 2.0 mm, the temperature of the outer wall 34 may be about 155 degrees F., or

a temperature differential of about 30 degrees F. The cavity width may also be modified to create other desired temperature differentials, such as about a 3.0 mm cavity 44 providing a temperature differential of about 40 degrees F., or for a width of about 4.0 mm, a temperature differential of about 45 degrees F., with a liquid/product temperature of about 185 degrees F. in the container 30.

[0022] It should be recognized that by modifying the configuration of the cavity 44, the temperature sensitivity characteristics of the outer wall 34 can be provided as desired. Thus, as can be seen from this example, the temperature of the outer wall 34 may vary dependent on the dimensions of the cavity 44, both for cold and hot products in container 30, providing significant temperature mediation to the users hand relative to the temperature of the product in the container 30. Thus, the size of the cavity 44 may be increased to provide further temperature mediation if desired, while also reducing the heat transfer characteristics to maintain the temperature of the product more stable over a longer period of time.

[0023] In this embodiment of the invention, first face 32 of inner sidewall 31 the second face 36 of outer sidewall 34, may be polycoated, similar to prior examples. The inner surfaces of cavity 44 may also be polycoated if desired. The first and second faces 38 and 39 of bottom wall 37 may be polycoated. Polycoating the surfaces may provide enhanced structural integrity to each of the walls, and prevents any absorption of condensation or any liquid therein, thereby retaining the integrity of each paper layer used in each wall 31, 34 and 37.

[0024] Suitable polycoating materials for use in examples of the invention may include polymers of ethylenically unsaturated monomers, such as for example, high density and low density polyethylene, olefinic copolymers containing a polyolefin as one of the components thereof, for example, ethylene-propylene copolymers, ethylene-vinyl acetate copolymers, polyvinyl chloride, polyvinylidene chloride, polylactic acid, calcium carbonate/polyethylene (such as an HDPE) blends, and the like.

[0025] In one embodiment, the polycoating material is polyethylene. The polyethylene used herein as a polycoat may include polyethylenes that have highly branched and widely spaced chains. Such branched chain polyethylenes are typically characterized as having

densities of about 0.910 to about 0.925 g/cm^3, crystallinities of about 50-60%, and melting points in the range of about 100 °C to about 110 °C.

[0026] In another embodiment of the invention, the polycoating material is polylactic acid, which is environmentally friendly due to its biodegradable and compostable post- use characteristics. The polylactic acid polycoat typically has a glass transition temperature of about 59 °C and a melting point of about 178 °C. Polylactic acid is a strong thermoplastic material that can be injection molded, extruded, cast, or thermoformed. Other eco-friendly materials may be used, such as a calcium carbonate/HDPE blend, which is largely biodegradable.

[0027] In one embodiment, the polycoating of surfaces of the containers according to the invention has a thickness of up to about one mil. In another embodiment, the polycoating has a thickness in the range from about 0.5 mil to about 1.5 mil. The polycoat can be applied to desired surfaces or walls of the container by any method known in the prior art.

[0028] As an example, a container may be formed according to an example of the invention, with the inner wall 11 formed of a 330 gram weight paper layer such as solid bleach sulfate (SBS) with a polyethylene (PE) coating on the inner wall thereof. The outer wall 14 is formed with a height to extend from the top of the bottom wall 17 to the brim of the inner sidewall 11, and may be formed of a 250g SBS with a PE polycoating on exterior surface. The bottom wall 17 may also be a 250g SBS layer with a PE coating on the interior and exterior surfaces. The container 10 of this example is constructed of minimal materials and is therefore cost-effective to manufacture, and may use only coatings on the inside of container 10 and outside of outer wall 14, due to air tight sealing between walls 11 and 14 which prevents air from contacting the surfaces of the cavity 22 according to the embodiments. The cavity 22 is manufactured such that the air within cavity 22 does not have the properties to form condensation when atmospheric conditions outside the container 10 form condensation on the second face 16 of outer wall 14 for example. Alternatives to the use of PE-coated SBS which is recyclable, may be PLA-coated SBS, which is compostable and biodegradable, or paperboard with a calcium-carbonate /polyethylene blend laminate which is readily biodegradable and also very environmentally friendly. A container formed in this manner may have a temperature sensitivity on the exterior of the container 10, which for hot applications is at least about 20-25

degrees F. below beverage temperature due to tapered design and insulation effect of the cavity formed by the multi-wall design. For cold applications, the exterior of the container 10 may be at least about 15-20 degrees F. above the beverage temperature due to the air-cushioned design. Thus, the beverages or products that may be usable in the cup or container 10 may be used with cold liquids or beverages down to about 25 degrees F or less, and hot liquids or beverages up to about 185 degrees F or more for example. As described, the temperature handling characteristics may depend on the configuration of the cavity in embodiments of the invention, and type of application for which the container is to be used. The container of the invention may thus be used as a cup, bowl, or of other configurations for use with hot or cold beverages or food products (i.e. cold drinks, slushies, milkshakes, smoothies, ice cream, hot soups or other hot food products, etc.), and may thus be comfortable to hold regardless of whether a very cold or very hot liquid or food product is contained therein, without requiring a separate jacket or the like. The arrangement further provides sensitivity to the temperature of the product to the hand, thereby indicating a very hot product such that the user is aware and will not inadvertently burn their lips or mouth.

[0029] Turning to Fig. 4, a multi-layer container embodiment as contemplated according to the invention is shown at 50, and includes inner sidewall 51, outer sidewall 54 and bottom wall 57. Inner sidewall 51 includes first face 52 and a second face 53. Outer sidewall 54 includes first face 55 and second face 56. Bottom wall 57 includes first face 58 and second face 59.

[0030] In an example, multi-wall container 50 is formed of a paperboard material, such as a solid bleach sulfate paperboard (SBS), with polycoating materials such as polyethylene, PLA or other suitable coatings for example. The paperboard layers of multi-wall container 50 may have a thickness in the range from about 0.25 to about 0.45 mm, and the thickness of each layer may be distinct or do not have to be equivalent to one another.

[0031] Inner sidewall 51 includes an outwardly extending ridge or brim portion 60 located around the upper portion of multi-wall container 50. Ridge portion 60 not only facilitates the flow of liquids from container 50, but also provides a region beneath which the outer sidewall 54 may sealingly engage inner sidewall 51 at its top edge.

[0032] Outer sidewall 54 also may include spacer portion 61, such as curved, u-shaped, folded or box-like folded portions, at the bottom edge, and/or spacer portion 62 at the top edge, that are formed towards and in contact with second face 53 of inner sidewall 51. Spacer portions 61 and 62 of outer sidewall 54 creates a cavity 64 between the inner sidewall 51 and outer sidewall 54 extending from the top portion of the container 50 to adjacent the bottom portion, and an airtight seal may be formed between second face 53 of inner sidewall 51 and first face 55 outer sidewall 54. In general, the outer sidewall 54 is sealed to the inner wall 51 to substantially prevent air inflow between the inner sidewall 51 and outer sidewall 54. The cavity 64 provides insulative characteristics, with the insulative characteristics being set or modifiable based on the dimensions of the cavity 64. In this example, the cavity 64 may be configured such as in prior embodiments, and may have its insulative characteristics modified by changing the dimensions of the portions 61 and 62, to increase or decrease the size and volume of cavity 64. The spacer portions 61 and 62 may be of the same or different dimensions, to make the size of the cavity uniform or of increasing volume toward the top or bottom of the container 50 if desired, or the spacers 61 or 62 may be removed to form a tapered cavity if desired. The insulation provided by the cavity 64 is further maintained and enhanced by effectively sealing the cavity 64 at both the top and bottom edges, such that airflow or air exchange with the outside atmosphere is not enabled, and the static air in the cavity forms a thermal barrier between the inner wall 51 and outer wall 54. Further, as the cavity 64 is effectively sealed from the outer atmosphere, no moisture in the atmosphere is introduced into the cavity 64, thereby preventing any condensation in the cavity 64. Additionally, the air within cavity 64 does not have the properties to form condensation when atmospheric conditions outside of container 50 form condensation on the second face 56 of the outer wall 54.

[0033] In this embodiment, there is provided a third, middle wall or layer 66 in between the outer wall 54 and inner wall 51 of the container configurations if desired. The middle layer 66 may be offset from both the inner and outer walls by suitable spacer type members 68, or may use spacer portions as in prior embodiments, such as curved, u-shaped or box-like portions at the top and bottom (or other locations) to create an offset between layer 66 and the other layers. The middle layer 66 would further create temperature mediation to the outer wall and provide additional insulation characteristics, and/or prevent condensation in the cavity, for example. Further, such a middle layer, and/or the outer surface of the inner wall 51 and/or the inner

surface of the outer wall 54 in the examples shown, may also be provided with an insulating type of material thereon or in association therewith, to inhibit transfer of cold or hot temperatures. Such insulating materials may include a foam type of layer, a metal foil, a phase change material, or other suitable materials that will serve to slow the transfer of heat or cold from or to the liquid or product within the container.

[0034] The dual or multi-wall container embodiments, as discussed hereinabove, provides a multitude of advantages for use in the foodservice industry. In particular, since multi-wall containers may be used for both hot and cold drinks or products, only a single container is required when selling hot and cold drinks or products to customers. The use of a single container for both hot and cold drinks, according to one embodiment of the invention, streamlines inventory management by not requiring one container for hot drinks or products and a second container for cold drinks or products. In another embodiment of the invention, the use of a single container for both hot and cold drinks or products may substantially eliminate the need for complex stock-keeping-unit (SKU) system. Usage of the SKU system is rooted in data management, enabling a merchant to systematically track inventory, such as in warehouses and retail outlets. SKUs are often assigned and serialized at the merchant level. Typically, each SKU is attached to an item, variant, product line, bundle, service, fee, or attachment. Since multi-wall container 10 may be used for both hot and cold drinks, the use of SKUs may be simplified. Additionally, the container of the invention achieves functionality similar to that of expanded styrene types of containers, and provides a more post-consumer use, environmentally friendly configuration. The container of the invention may also provide temperature sensitivity to the user when holding or using the container, to provide some indication of the temperature of the liquid or product in the container, distinct from styrene type containers that may not provide such temperature sensitivity.

[0035] Based upon the foregoing disclosure, it should now be apparent that the multi-wall container as described herein will carry out the objects set forth hereinabove. It is, therefore, to be understood that any variations evident fall within the scope of the claimed invention and thus, the selection of specific component elements can be determined without departing from the spirit of the invention herein disclosed and described.

CLAIMS

What is claimed is:

1. A multi-wall container comprising:

a first inner sidewall having a first face and a second face, wherein the first face of the first sidewall is polycoated;

at least a second outer sidewall having a first face and a second face, wherein the second face of the second sidewall is polycoated; and

a bottom wall having a first face and a second face, wherein the first and second faces of the bottom wall are polycoated.

2. The container of claim 1, wherein at least one spacer portion is provided at least at the adjacent the bottom portion of the second outer sidewall.

3. The container of claim 2, wherein the spacer portion of the second outer sidewall extends towards and is in contact with the second face of the first inner sidewall.

4. The container of claim 3, wherein the at least one spacer portion of the second outer sidewall creates a cavity between the second face of the first inner sidewall and the first face of the second outer sidewall.

5. The container of claim 4, wherein second outer sidewall substantially prevents air inflow between the first inner sidewall and second outer sidewall.

6. The container of claim 5, wherein the prevention of air inflow between the first inner sidewall and second outer sidewall substantially precludes the formation of condensation between the first inner sidewall and second outer sidewall.

7. The container of claim 4, wherein the at least one cavity has static air trapped therein at the time of manufacture, wherein the static air does not have the properties to form condensation

when atmospheric conditions outside the container would form condensation on the second face of the second sidewall.

8. The container of claim 4, wherein the at least one spacer portion creates a cavity between the second face of the first inner sidewall and the first face of the second outer sidewall, and the dimensions of the spacer portion are modified to modify the dimensions of the cavity.

9. The container of claim 2, wherein at least two spacer portions are provided at least adjacent the top and bottom of the outer sidewall.

10. The container of claim 9, wherein the at least two spacer portions create a cavity having a substantially uniform width from top to bottom.

11. The container of claim 9, wherein the at least two spacer portions create a cavity having a non-uniform width from top to bottom.

12. The container of claim 11, wherein the at least two spacer portions create a cavity having a tapered configuration between the top to bottom.

13. The container of claim 12, further comprising at least one layer of material positioned in the cavity which provides additional temperature barrier properties to slow temperature transfer between the inner sidewall and outer sidewall.

14. The container of claim 1, wherein the second face of the first sidewall is polycoated, and the first face of the at least a second outer sidewall is polycoated.

15. The container of claim 1, wherein the container can be formed in a single stock-keeping-unit for use with both hot and cold liquids/products.

16. A multi-wall container comprising:

a first inner sidewall having a first face and a second face, wherein the first face of the first sidewall is polycoated, and the second face is not polycoated;

at least a second outer sidewall having a first face and a second face, wherein the second face of the second sidewall is polycoated and the first face is not polycoated, and wherein at least one spacer portion is provided at least at a position adjacent the bottom portion of the second outer sidewall, whereby the at least one spacer portion creates a cavity between the second face of the first inner sidewall and the first face of the second outer sidewall, and wherein the at least one spacer substantially prevents air inflow between the first inner sidewall and second outer sidewall and wherein the at least one cavity has static air trapped therein at the time of manufacture wherein the static air does not have the properties to form condensation when atmospheric conditions outside the container would form condensation on the second face of the second sidewall; and

a bottom wall having a first face and a second face, wherein the first and second faces of the bottom wall are polycoated.

17. A multi-wall container comprising:

a first inner sidewall having a first face and a second face, wherein the first face of the first sidewall is polycoated, and the second face is not polycoated;

at least a second outer sidewall having a first face and a second face, wherein the second face of the second sidewall is polycoated and the first face is not polycoated, wherein the at least second sidewall is spaced from the first sidewall to form a sealed cavity therebetween, wherein the at least one cavity has static air trapped therein at the time of manufacture wherein the static air does not have the properties to form condensation when atmospheric conditions outside the container would form condensation on the second face of the second sidewall and at least one layer of material positioned in the sealed cavity and spaced from the first inner sidewall and second outer sidewall; and

a bottom wall having a first face and a second face, wherein the first and second faces of the bottom wall are polycoated.

18. The multi-wall container of claim 17, wherein the at least one layer of material positioned in the cavity provides additional temperature barrier properties to slow temperature transfer between the first inner sidewall and the second outer sidewall.

19. The multi-wall container of claim 18, wherein the at least one layer of material positioned in the cavity includes an insulating material which provides additional temperature barrier properties to slow temperature transfer between the first inner sidewall and the second outer sidewall.

20. The multi-wall container of claim 18, wherein at least two spacer portions are provided at least adjacent the top and bottom of the outer sidewall and the dimensions of the spacer portions are selectively modified to modify the dimensions of the cavity.

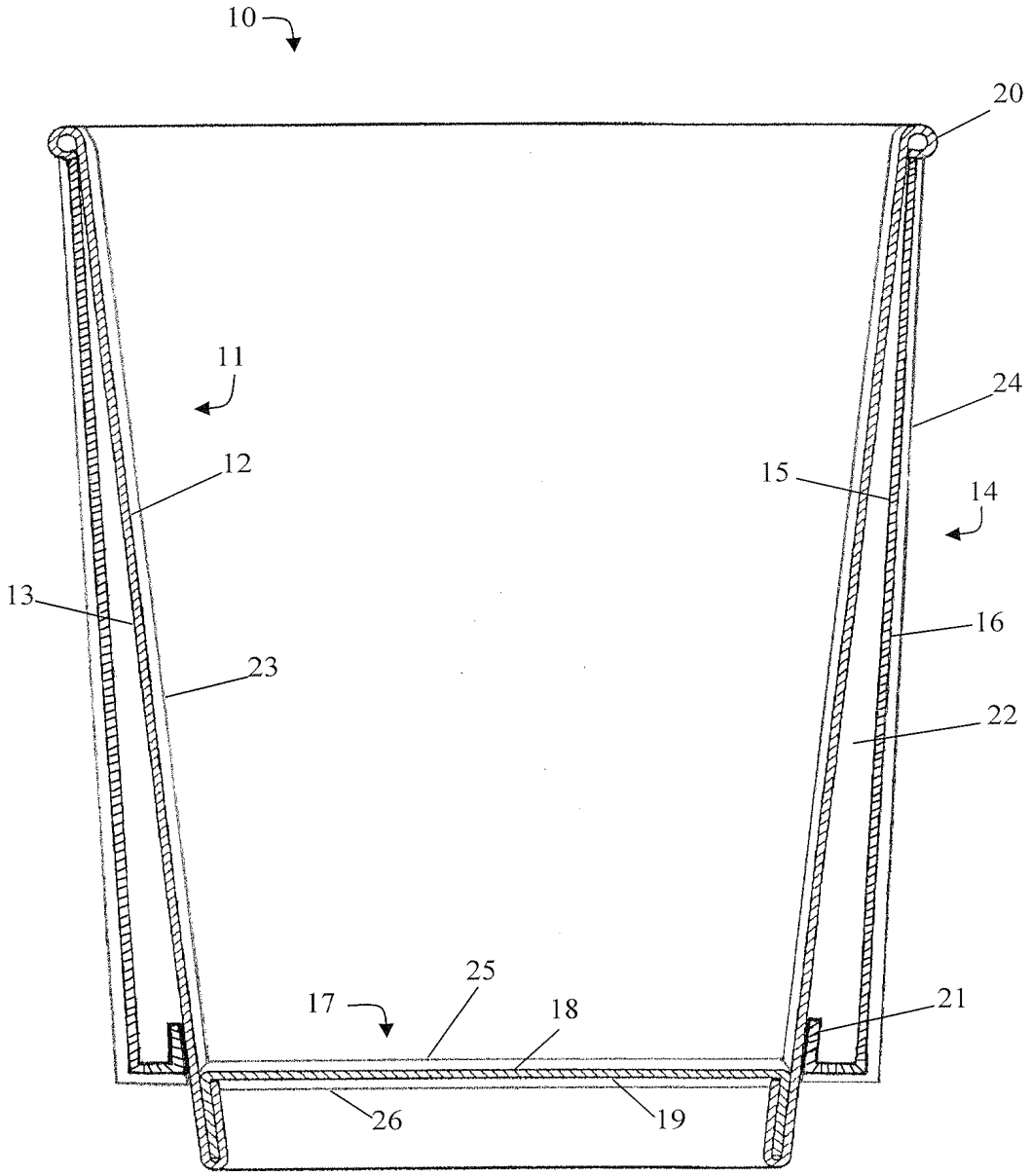

FIG. 1

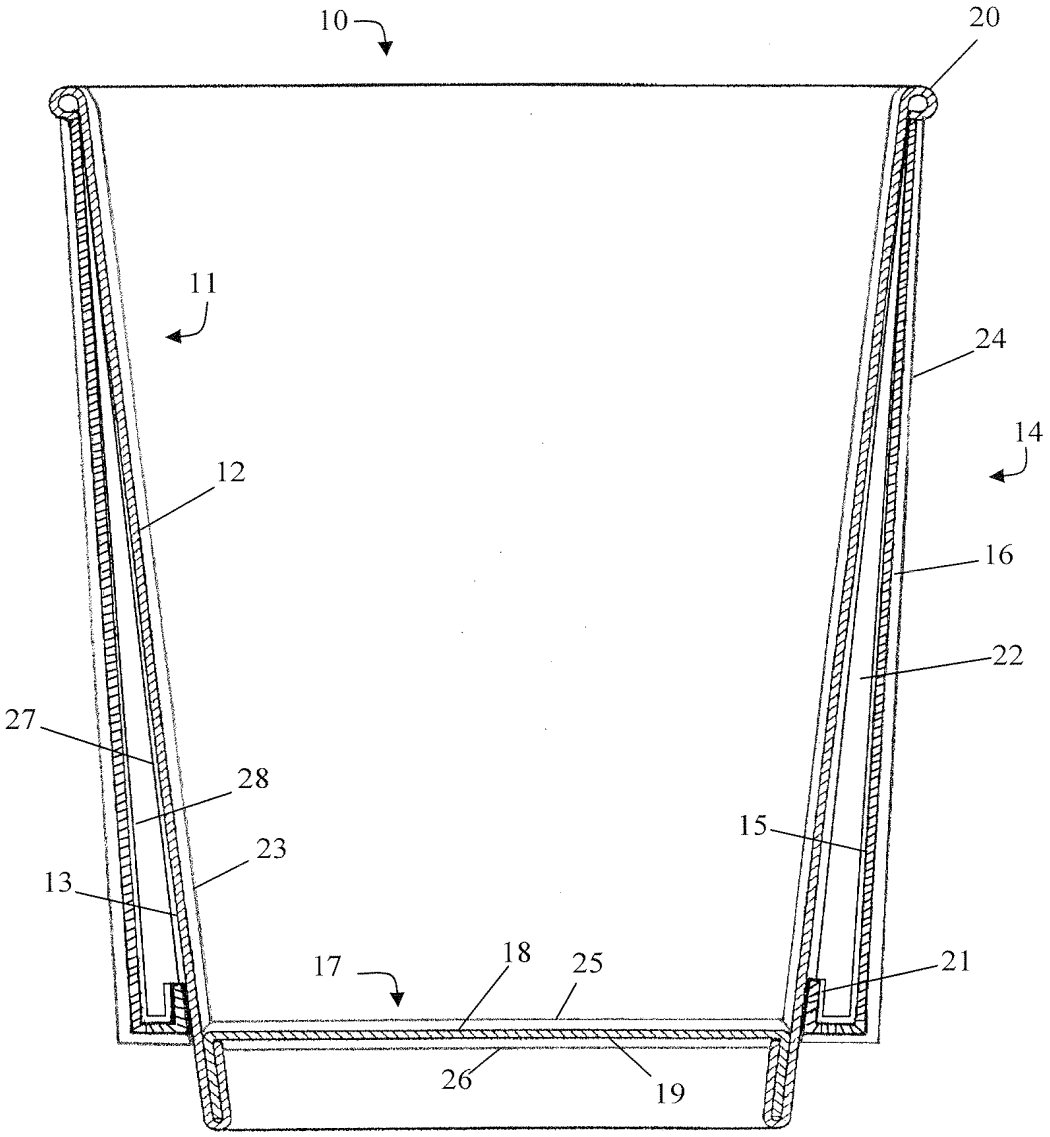

FIG. 2

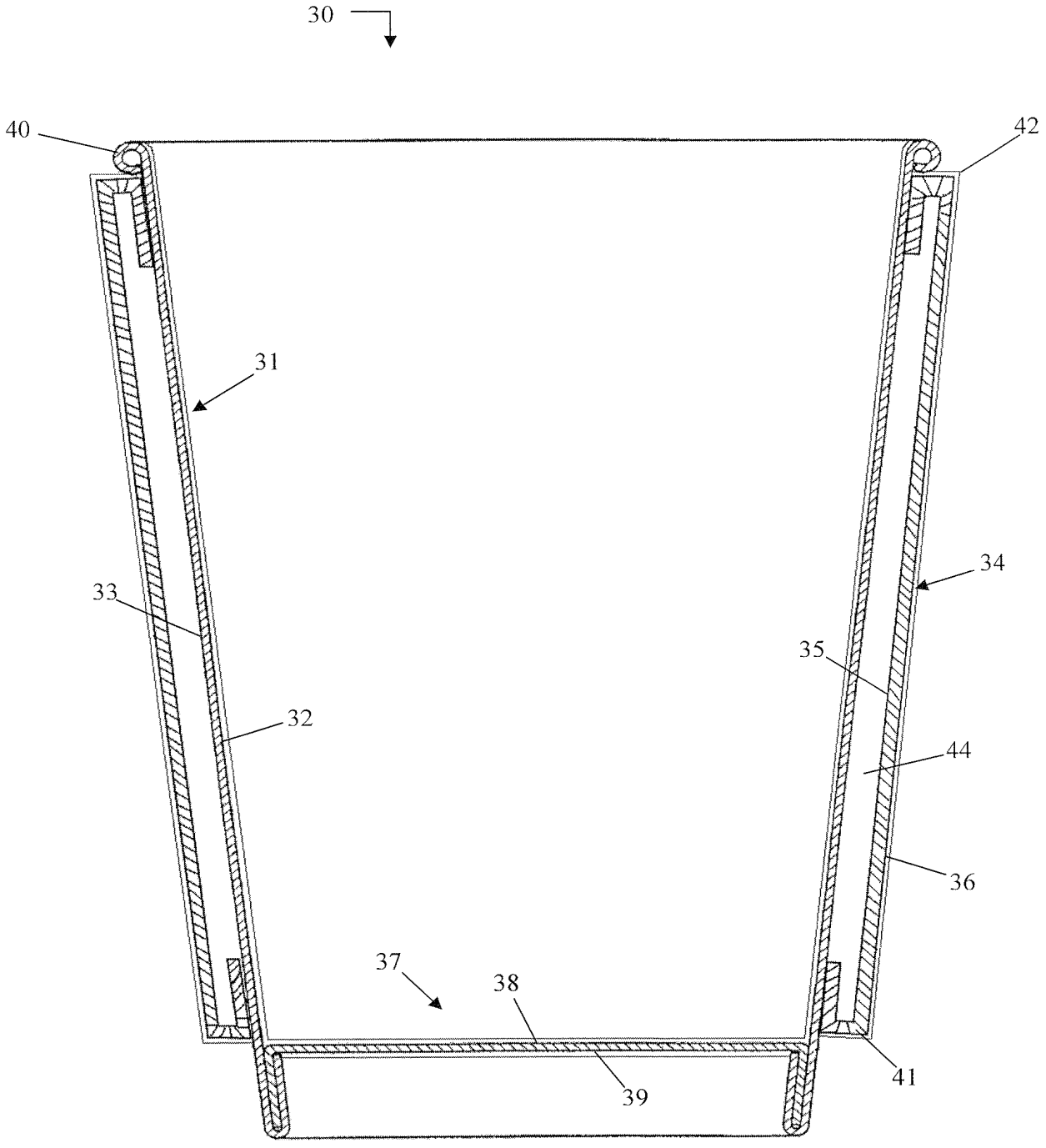

Fig. 3

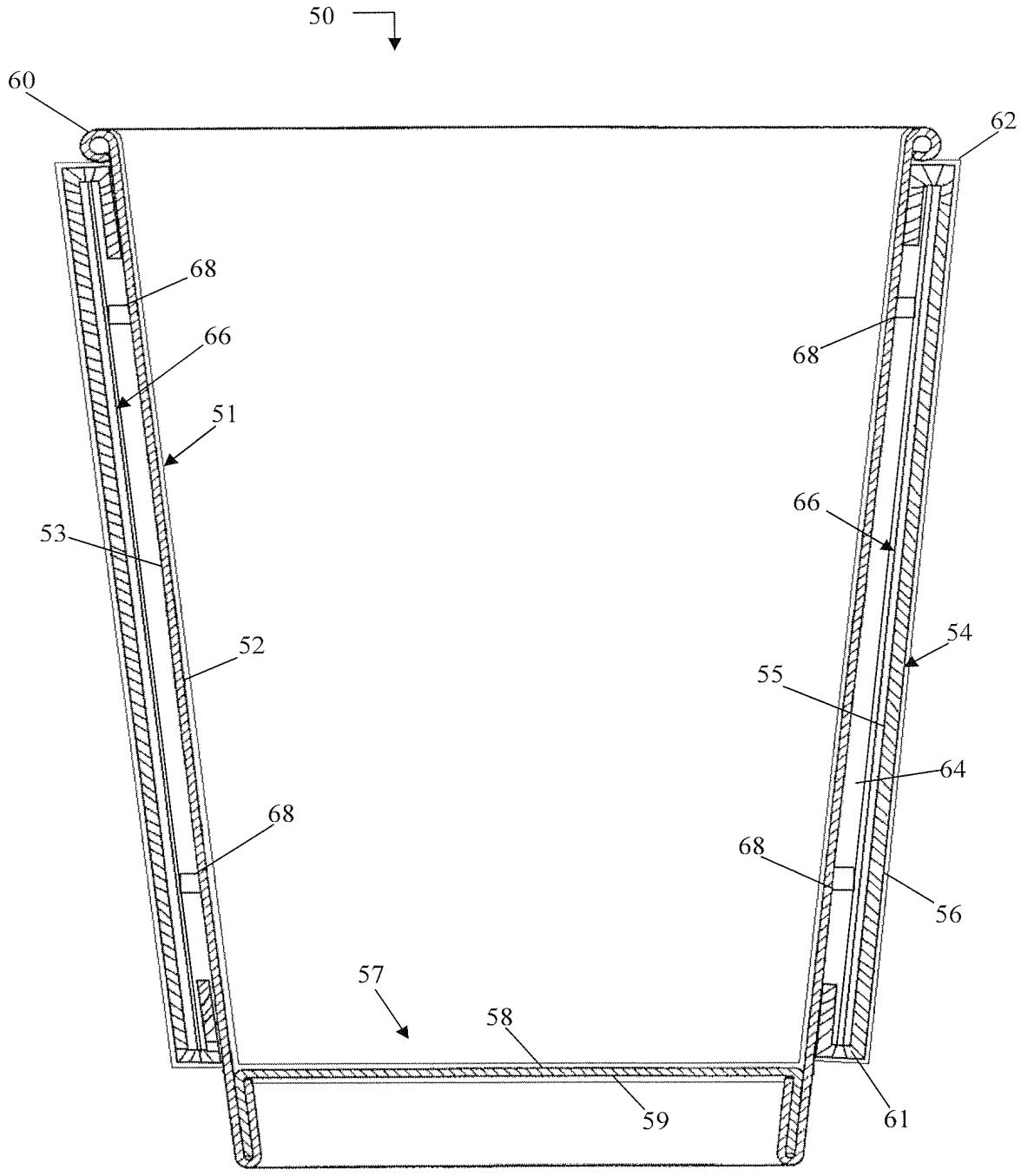

Fig. 4

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2008/073141

A. CLASSIFICATION OF SUBJECT MATTER

B65D 3/22(2006.01)i, B65D 5/58(2006.01)i, B65D 5/04(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 8 : B65D 3/22, B65D 81/38, B65D 81/34

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models since 1975
Japanese utility models and applications for utility models since 1975

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKIPASS (KIPO internal) & Keywords: container, wall, insulation, heat, coating and similar terms

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X/Y	JP 2000-103480 A (DAINIPPON INSATSU CO., LTD.) 11 April 2000 See pages 2 - 3 and figure 1.	1 - 10, 14 - 16 / 11 - 13, 17 - 20
Y/A	KR 20-0339386 Y1 (HYUNJIN JEOEP. CO., LTD.) 24 January 2004 See abstract and figures 1 - 5.	11, 12 / 1 - 10, 13 - 20
Y/A	KR 20-0197818 Y1 (BYUNGHUN PARK) 15 September 2000 See abstract and figures 1 - 3.	13, 17 - 20 / 1 - 12, 14 - 16
X/Y/A	JP 2000-103476 A (DAINIPPON INSATSU CO., LTD.) 11 April 2000 See pages 2 - 3 and figure 1.	1 - 9, 14 - 16 / 11 - 13, 17 - 20 / 10

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
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"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents,such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
12 DECEMBER 2008 (12.12.2008)	**13 DECEMBER 2008 (13.12.2008)**

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/US2008/073141

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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KR 20-0339386 Y1	24.01.2004	None	
KR 20-0197818 Y1	15.09.2000	None	
JP 2000-103476 A	11.04.2000	None	